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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,119	10/31/2003	Young Chul Kim	8111-036-999	5009
20583	7590	03/18/2005	EXAMINER	
JONES DAY 222 EAST 41ST ST NEW YORK, NY 10017			CANNING, ANTHONY J	
			ART UNIT	PAPER NUMBER
			2879	

DATE MAILED: 03/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

**Office Action Summary**

Application No.

10/699,119

Applicant(s)

KIM ET AL.

Examiner

Anthony J. Canning

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-6 and 9 is/are rejected.
- 7) ☒ Claim(s) 7 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 rejected under 35 U.S.C. 102(e) as being anticipated by Korgel et al. (U.S. 2003/0003300 A1).
3. Regarding claim 1, Korgel et al. disclose a polymeric electroluminescent device including: an emitting layer (see Fig. 5, item 58; paragraph 0142, lines 1-4), which includes at least metal nanoparticles (see Fig. 5, item 58; paragraph 0142, lines 4-5; paragraph 0010, lines 1-5) and a luminescent polymer (see Fig. 5, item 58; paragraph 0142, lines 6-7); a cathode layer disposed on one side of the emitting layer (see Fig. 5, item 54; paragraph 0142, lines 1-4; paragraph 0030, lines 7-9); and an anode layer disposed on the other side of the emitting layer (see Fig. 5, item 56; paragraph 0142, lines 1-4; paragraph 0030; lines 6-7).
4. Regarding claim 2, Korgel et al. disclose the polymeric electroluminescent device of claim 1, wherein upon application of a bias voltage across the anode and cathode layers, holes and electrons are injected respectively from the anode and cathode layers to the emitting layer (paragraph 0006, lines 4-8; paragraph 0030, lines 6-9).

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5. Regarding claim 3, Korgel et al. disclose the polymeric electroluminescent device of claim 1, wherein the metal nanoparticle is one selected from a group of Au, Ag, Pt, Ni, Fe, Co and Ge (paragraph 0010, lines 1-5). Korgel et al. specifically disclose nanoparticles selected from Group IV elements. Germanium, Ge, is a Group IV element.

6. Regarding claim 4, Korgel et al. disclose the polymeric electroluminescent device of claim 1, wherein the luminescent polymer generates light with a wavelength between 400 and 800 nm (paragraph 0010, lines 12-13). Colored light has wavelengths that fall within the spectrum of 400 to 800 nm.

7. Regarding claim 5, Korgel et al. disclose the polymeric electroluminescent device of claim 4, wherein the luminescent polymer is one selected from a group of poly(dihexylfluorene), poly(phenylenevinylene) and poly(dioctylfluorene) (paragraph 0138, lines 6-9). Poly(p-phenylenevinylene) is the same as poly(phenylenevinylene).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 6 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korgel et al. (U.S. 2003/0003300 A1) in view of Duggal et al. (U.S. 6,515,314 B1).

10. Regarding claim 6, Korgel et al. disclose the polymeric electroluminescent device of claim 5, wherein the metal nanoparticles are 1 to 100 nm in size (paragraph 0140, lines 1-4). Korgel et al. fail to further disclose that the nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1.

Duggal et al. disclose an organic light-emitting device wherein the nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1 (column 1, lines 29-31; column 6, lines 53-55). The volume fraction is tailored to give a desired luminescence.

Therefore, it would have been obvious to one having ordinary skill in the art of organic light-emitting devices, at the time the invention was made, to modify the organic light-emitting device of Korgel et al. to include nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1 to give a desired luminescence.

11. Regarding claim 9, Korgel et al. disclose the polymeric electroluminescent device of claim 1, wherein the emitting layer includes metal nanoparticles (paragraph 0010, lines 1-5), which are formed by coating the surface of inorganic particles or polymeric particles with a metal (paragraph 0108, lines 23-26). Korgel et al. fail to disclose the metal particles dispersed in a luminescent polymer, at a volume fraction of  $1 \times 10^{-9}$  to 0.1.

Duggal et al. disclose an organic light-emitting device wherein the nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1 (column 1,

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lines 29-31; column 6, lines 53-55). The volume fraction is tailored to give a desired luminescence.

Therefore, it would have been obvious to one having ordinary skill in the art of organic light-emitting devices, at the time the invention was made, to modify the organic light-emitting device of Korgel et al. to include nanoparticles are mixed with the luminescent polymer at a volume fraction of  $1 \times 10^{-9}$  to 0.1 to give a desired luminescence.

***Allowable Subject Matter***

12. Claims 7 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowance.

13. Regarding claims 7 and 8, the limitation wherein the metal nanoparticles are gold overcomes the prior art of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Pertinent Prior Art***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

15. Shi et al. (U.S. 5,677,545), McNulty et al. (U.S. 2003/0111955 A1), and Duggal et al. (U.S. 2001/0033135) are all pertinent prior art in the field of organic light-emitting devices using polymers in the emitting layer.

***Contact Information***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony J. Canning whose telephone number is (571)-272-2486. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh D. Patel can be reached on (571)-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Anthony Canning *ac*

14 March 2005

*Ashok Patel*  
**ASHOK PATEL**  
**PRIMARY EXAMINER**